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(54) **Printing method for display material**

(57) A method of applying a colour on to a display material (eg a colour chart or card) to represent the colour of a paint (eg which is to be used on a vehicle body), wherein the colour is applied by screen printing a colouring screen printing medium comprising colour pigments of the paint which is to be represented. A varnish or lacquer may be applied following the above step and the varnish or lacquer may be cured by UV light.

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**PRINTING METHOD**

The present invention relates to printing and in particular to a method of screen printing colour onto display material such as colour charts and cards used to represent paint colours.

At present, the representation of a paint colour on a colour chart is achieved by the following two methods.

10 The first method is lithographic reproduction of the paint colour, which is achieved, either by a four colour ink printing process, or more usually by multiple or split single colour ink printing, onto a paper or card display material.

15 The lithographic process has a number of serious drawbacks. A particular problem is that it is impossible to apply a sufficient amount of ink to the display material to provide a good imitation ie an accurate representation of the actual colour of the paint when applied to its normal substrate (eg. vehicle body panel in the case of vehicle spray paints). This problem is exacerbated if the paint colour to be represented is metallic or mica-metallic because such paints comprise particles of alloys which are too heavy to distribute evenly in the lithographic printing process. As a result, the representation of metallic paints is particularly poor with this process.

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The second process used presently to represent paint colours comprises spraying panels of board or paper display material with spray paint such as vehicle spray paint. A layer of varnish or lacquer is then sprayed onto the panels. Finally, the sprayed panels are cut into rectangles and glued to a second display material to form a colour chart.

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In the spray panel process, the coloured panels produced do not have the same finish as the finish produced by application of the actual paint, even when the formula of the spray paint used is the same as the spray paint colour to be represented. This may be due to variations in the amount of lacquer or varnish on the panels, because the different coloured panels are  
5 varnished separately.

As the panels are cut by guillotine or platen, the shapes of panel which can be produced are severely restricted. Complicated shapes such as a  
10 signature can not be produced and any non-regular shape would require a special shaped cutter and this would lead to a great deal of sprayed panel wastage.

Another significant disadvantage of the spray panel process is that the  
15 panels stand proud of the second display material on which they are mounted. The uneven thickness of the structure produced prevents it from being re-fed into a printing machine for the over-printing of items such as dealer name, logos, revisions, prices, etc.

20 It is an object of the present invention to overcome the above and other disadvantages of known paint colour representation processes.

According to the invention there is provided a method of applying a colour onto a display material to represent the colour of a paint, wherein the  
25 colour is applied by screen printing a colouring screen printing medium comprising colour pigments of the paint to be represented.

Surprisingly, the inventors have found that by applying the colour pigments used in the actual paint to be represented in a screen printing  
30 process, it is possible to achieve an excellent imitation or representation

of the actual paint colour on the display material. The colour obtained has a depth of colour which known processes are unable to reproduce. The method of the invention is particularly suitable for representing metallic or mica-metallic paint colours on a display material such as paper or card.

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Preferably, the amount of colour pigments deposited on the display material is at least 70% of the amount which would be deposited on a substrate by a normal application of the paint to be represented.

- 10 Advantageously, the amount of colour pigments deposited on the display material is substantially the same as the amount deposited on a substrate by a normal application of the paint to be represented.

- 15 By applying the above amount of colour pigments to the display material using the method of the invention one can reproduce the depth of colour of the paint when applied to its normal substrate.

- 20 Preferably, the coloured display material obtained by the method of the invention is varnished or lacquered to produce a lustrous finish. A particularly preferred varnish is curable using U.V. light, such as Uvibond 391 supplied by Sericol Group Limited, UK. In particular, it is possible to achieve the same lustre as that produced when metallic or mica-metallic paints are sprayed onto vehicle body panels.

- 25 By "normal application" it is meant an application of paint onto its usual substrate. For example in the case of vehicle paint, the substrate is a vehicle body panel which is normally made of metal.

- 30 Preferably, the colouring medium comprises a spray paint powder suspended in a proprietary screen printing base medium. Favoured base

media include Plastijet XG Varnish and Color Star CS/SX Varnish manufactured by Sericol Group Limited, UK.

Suitable spray paint powders are available from manufacturers such as Carrs Paints Limited, UK and spray paint solutions from Bancrofts Motor Factors Limited, UK.

If necessary to obtain a suitable viscosity of the colouring medium for screen printing, the colouring medium of the invention may comprise spray paint solution mixed with an ink flow agent and preferably a thinning agent. Both types of agent are well known to persons skilled in the art and are available from most specialist screen printing ink manufacturers. At high temperatures or so-called "hot shop conditions" it may be necessary to omit the thinner and add a retarder agent.

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The amount of flow agent, thinning agent or retarder to be mixed with the spray paint to form a colouring medium suitable for screen printing will vary depending on the particular spray paint used. For each different spray paint a skilled worker can arrive at the optimum mixture by a small amount of routine experimentation involving nothing more than trial and error.

The colouring medium may also comprise a spray paint pigment powder suspended in a screen printing base medium. If necessary, the suspension can also contain a thinner agent, or a retarder agent in high temperature conditions, to obtain a suitable viscosity.

A particular advantage of the method of the invention is that it is easy to control the screen printing process to produce colour representations of any desired shape. For example, when the colour of vehicle spray paint

is represented, it is preferred that the colour is applied to the display material in the form of lettering spelling the name of the car manufacture, or of the shape of a particular vehicle model.

- 5 Preferably, the method of the invention further comprises a step of over-printing the coloured display material. This is achieved in a known manner by inserting the coloured display material into a printing machine. As mentioned previously, the product of known spray panel processes is unsuitable for over-printing. The present invention overcomes such  
10 problems.

It will be appreciated that the method of the invention enables much more interesting and attractive colour cards and charts to be prepared than is possible with present methods.

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The invention also relates to any display material coloured by means of any of the above methods.

- Preferred embodiments of the invention will now be described, by way of  
20 example only.

#### Example 1

- To form a colouring screen printing medium, commercially available  
25 spray paint pigment powder, for example "Jaguar Jade Green" Ref X3300 from Carrs Paints Limited, UK is suspended in a commercially available screen printing ink base medium, namely Plastijet XG Varnish (CXG-383) sold by Sericol Group Limited, UK.

- 30 The ratio of spray paint powder to base medium effects the amount of

paint powder which is applied in a single stroke of the squeegee over the mesh. Preferably the ratio is substantially the same as the ratio of powder to paint base medium of the spray paint. The preferred mixture comprises approximately 80% pigment powder and approximately 20% varnish, by volume.

The pigment and varnish are preferably mixed using a known high speed mixer or known dispersants.

10 Preferably, a viscosity suitable for screen printing is obtained, for example by adding up to 15% by volume of a thinner such as XG (ZV-551).

At the high temperatures ("hot shop conditions") commonly experienced in printing workshops the thinner may be omitted and up to 5% by volume of a retarder such as SG (ZV-553) is added to the pigment varnish mixture to obtain a suitable viscosity. The colouring screen printing medium obtained is used with a conventional screen printing machine, preferably model SPS Vitessa Flex A1 made by SPS Von Holzschuler, Wuppertal, Germany.

20 The colouring medium is screen printed onto a display material comprising 180 grams per metre<sup>2</sup> matt coated board with the above machine using 120.40 Heavy Duty mesh at a printing speed of 2000 impressions per hour (I.P.H.).

25 The paint powder pigment is applied in an amount of about 13 grams per metre<sup>2</sup>. This amount is substantially the same as the amount of paint powder which is applied to vehicle body panels. Hence the coloured areas on the paper produced according to the method of the invention are almost  
30 identical in colour to the colour of paint on the vehicle.

The coloured display material is then preferably dried using a known dryer such as a Color Dry Combi Dryer which comprises a belt that travels through a lead in section, a 2 metre long heater (48 KW) section, a ½ metre 2x300 watt per inch U.V. bridge, a 1 metre cooler section and  
5 a ½ metre exit section. Drying with the machine can be carried out at a temperature of 65°C with a belt speed of 18 metres per minute.

### Example 2

10 A spray paint solution comprising "Land Rover Montpellier Red" Ref P422-57t3B supplied by Bancrofts Motor Factors is used as the colouring screen printing medium. To obtain a suitable viscosity the spray paint can be mixed with up to 10% by volume of a thinner such as CS/SX thinner (ZC-530) and up to 15% by volume of an ink flow agent such as the agent  
15 XT-633. At high temperatures the thinner may be omitted and up to 10% by volume of a retarder such as ZC-533 added.

### Varnishing or lacquering process

20 After spraying onto a substrate such as a vehicle body, two to four coats of varnish or lacquer are applied to product the characteristic lustre of a paint.

After the above screen printing step to obtain coloured display material in  
25 the present invention a varnish or lacquer is applied to achieve the desired lustre of the paint to be represented.

It is preferred in the present invention that the varnish is an ultra violet curing varnish which can be used to produce a very high gloss finish or  
30 be matted as required. Unlike conventional inks and paints which dry by

the evaporation of a thinning agent and only leave a small proportion of their lacquer or pigment behind on the substrate, U.V. varnish, is flash cured using a high intensity U.V. light source. This U.V. curing process burns little or none of the varnish coat weight off so that sufficient lustre is obtained by one application of the varnish.

A particularly preferred varnish is Uvibond 391 (UV-391) supplied by Sericol at a printing viscosity. This varnish is preferably used in the above screen printing machine fitted with a 165.3 Twill Weave (T.W.) screen mesh, with the 2x300 watt per inch U.V. bridge effecting curing. The Combi dryer mentioned above is used at a speed of 22 metres per minute. With such an arrangement a speed of 2800 I.P.H can be achieved.

To produce a paint chart, multiple screen printing steps can be carried out using different colouring media and the multi-coloured display material produced can then be varnished as described above to produce a finished product in which the paint colours are almost identical to the colour of the paint when applied to its normal substrate.

By using appropriate stencils in a known manner, the coloured areas applied to the paper can be of any desired shape.

If necessary, the coloured paper produced can then be overprinted.

The amount of paint powder applied to the display material can be varied by selecting different screens, because the screens are made from woven fabrics and each has a predetermined open area.

The angle of attack of the squeegee blade is also a determining factor in

the amount of paint powder which is applied during the screen printing process with a given mesh.

- 5 The above selections to produce any desired amount of paint powder application are within the knowledge of workers in the art. A commonly used screen printing manual which details basic screen printing principles is Screen Printing Techniques by Albert Kosloff which is available from Sericol Limited (ref PB-591).

**CLAIMS**

1. A method of applying a colour onto a display material to represent the colour of a paint, wherein the colour is applied by screen printing a colouring screen printing medium comprising colour pigments of the paint to be represented.
2. A method as claimed in Claim 1 wherein the amount of colour pigments deposited on the display material is at least 70% of the amount which would be deposited on a substrate by a normal application of the paint to be represented.
3. A method as claimed in Claim 2 wherein the amount of colour pigments deposited on the display material is substantially the same as the amount which would be deposited on a substrate by a normal application of the paint to be represented.
4. A method as claimed in Claim 1, 2 or 3 wherein the colouring medium comprises spray paint powder as colour pigments, suspended in a screen printing base medium.
5. A method as claimed in Claim 4 wherein the ratio of base medium to spray paint powder is substantially the same as the ratio of the base medium to spray paint powder in the spray paint to be represented.
6. A method as claimed in Claim 1, 2 or 3 wherein the colouring medium comprises a spray paint solution mixed with a flow agent and a thinning agent or a retarder agent as required to produce a colouring medium having a viscosity suitable for screen printing.

7. A method as claimed in any preceding claim wherein the spray paint is a vehicle spray paint.
8. A method as claimed in any preceding claim wherein the mesh used  
5 for the screen printing is selected to apply the colour pigments to the display material in an amount of 13 grams per metre<sup>2</sup>.
9. A method as claimed in any preceding claim wherein the colour is applied to the display material to form coloured areas defining a  
10 predetermined shape or pattern.
10. A method as claimed in any preceding claim wherein the display material is paper or card.
- 15 11. A method as claimed in any preceding claim wherein the substrate is a vehicle body panel.
12. A method as claimed in any preceding claim wherein the method comprises a further step of overprinting.
- 20 13. A method as claimed in any preceding claim which further comprises the step of varnishing the screen printed display material.
14. A method as claimed in Claim 13 wherein the varnish can be cured  
25 by exposure to U.V. light.
15. A method of applying a colour onto a display material by screen printing substantially as described herein.

12

**Patents Act 1977**  
**Examiner's report to the Comptroller under Section 17**  
**(The Search report)**

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**Relevant Technical Fields**

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**Date of completion of Search**  
**28 JUNE 1995**

**Databases (see below)**

- (i) UK Patent Office collections of GB, EP, WO and US patent specifications.

**Documents considered relevant following a search in respect of Claims :-**  
**1-15**

- (ii) ONLINE: WPI

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